Remarks

35 USC Section 102(b) Rejection:

Claims 1 – 3 were rejected under 35 U.S.C. Section 102(b) as being anticipated by Andersen et al. (US Patent No. 5,997,584).

The Examiner submits that Andersen teaches that the aliphatic substituents which make up the amines should be from about 8-18 carbon atoms (col. 9, lines 1-12). Therefore, the Examiner submits that Andersen anticipates the claims.

Applicant respectfully submits that Andersen discloses a method of reducing the pilling of polyester fabrics comprising the step of treating the fabric with a polyester hydrolytic enzyme (col. 1, lines 15-18 and claim 1). Andersen specifically discloses that "a certain group of enzymes are capable of hydrolysing terephtalic acid diethyl ester (ETE) and/or an ethyleneglycol dibenzyl ester (BEB), and therefore are polyester hydrolytic enzymes" (col. 2, lines 48-51). These enzymes are obtained from a microbial source (col. 3, lines 7-9). Thus, Applicant respectfully submits that it is the enzyme, not the detergent, that provides the pilling reduction mechanism for the polyester garments and fabrics disclosed by Andersen. The detergent, or surfactant, merely provides a delivery method for the enzymes (col. 2, lines 1-7). Thus, Applicant respectfully contends that the ampholytic surfactants cited by the Examiner cannot be equated to the alkyl amines claimed by Applicant because the ampholytic surfactants fail to provide the pilling reduction. But, it is these alkyl amines which provide improved pilling resistance for the instant invention as currently claimed.

As such, Applicant respectfully submits that Andersen fails to teach a hydrolizable polymer-containing textile article that has been chemically modified by branched chain amine treatment to achieve improved pilling resistance, wherein said branched chain amine is an alkyl amine containing from 8 to 14 carbon atoms. Accordingly, Applicant respectfully request reconsideration and withdrawal of this rejection.

35 USC Section 103(a) Rejection:

Claims 4-7, 19-20, 27, 29 and 39-43 were rejected under 35 U.S.C. Section 103(a) as being unpatentable over Andersen et al. (US Patent No. 5,997,584) in view of Kimbrell (WO 96/22416) and further in view of Farmer (US Patent No. 4,103,051).

Applicant is assuming that the Examiner intended to reject claims 8-18 and 21-26 under 35 USC Section 103(a) as well.

The Examiner submits that Andersen discloses a fabric treatment as claimed but does not disclose the particularly claimed branched chain amines. The Examiner also takes the position that it would have been obvious to have employed the particular types of yarns and fabrics disclosed by Kimbrell in the process of Andersen motivated by the fact that these fabrics benefited from being treated with an amine containing composition to reduce pilling.

The Examiner relies on Farmer to teach that suitable amines for treating polyester fibers include aliphatic amines having at least 10 carbon atoms and that branched chain amines such as 1,3 propane diamines and n-dodecylamines are suitable for reducing pilling. Therefore, the Examiner contends that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have employed 1,3 propanediamines and n-dodecylamines as the branched chain amines in view of the teaching of Farmer and that such compounds are particularly suitable for use in forming anti-pilling treatments for polyester fabrics.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art (MPEP § 2143.03). Applicant relies on the discussion above with regard to the teachings of Andersen. That is, Andersen teaches that certain enzymes, not alkyl amines, provide a method of reducing the pilling of polyester.

With regard to Farmer, Applicant respectfully submits that the reference does not disclose branched chain amines, as argued by the Examiner. The instant claims recite a hydrolizable polymer-containing textile article that has been chemically modified by branched chain amine treatment to achieve improved pilling resistance, wherein said branched chain amine is an alkyl amine containing from 8 to 14 carbon atoms. As best understood, the compounds disclosed by Farmer include aliphatic amines that have unbranched carbon chains. As support for this argument, Applicant submits the following facts and Exhibits with regard to the Farmer compounds (see Table 1 of the Farmer reference):

1. 1,3 propanediamine (CAS# 109-76-2) is a straight chain compound known by the following formula:

$$NH_2 - CH_2 - CH_2 - CH_2 - NH_2$$

See Exhibit A (2 pages).

2. N-coco-1,3 propanediamine (CAS# 61791-63-7) is formed by replacing a hydrogen (from one of the NH_2 moieties in the propanediamine) with an "R" group. The R group represents an alkyl substituent. Thus, for this particular compound, the R group is a straight chain alkyl substituent comprised mainly of $C_{12} + C_{14}$. See Exhibit B (8 pages).

3. N-tallow-1,3 propanediamine (CAS# 61791-55-7) is formed by replacing a hydrogen (from one of the NH_2 moieties in the propanediamine) with an "R" group. The R group represents an alkyl substituent. Thus, for this particular compound, the R group is a straight chain alkyl substituent comprised mainly of $C_{16} - C_{18}$. See Exhibit C (7 pages).

4. N-oleyl-1,3 propanediamine (CAS# 7173-62-8) is formed by replacing a hydrogen (from one of the NH_2 moieties in the propanediamine) with an "R" group. The R group represents an alkyl substituent. Thus, for this particular compound, the R group is a straight chain alkyl substituent comprised mainly of C_{18}. See Exhibit D (8 pages).

5. N-dodecylamine (CAS# 124-22-1) is a straight chain compound known by the following formula:

$$CH_3(CH_2)_{11}NH_2$$

See Exhibit E (5 pages).

Thus, Applicant respectfully submits that the Examiner's contention that Farmer teaches branched chain amines (with reference to Table 1 of Farmer) is incorrect. Rather, the compounds taught by Farmer are all straight chain amines, as exemplified by Exhibits A – E.

Accordingly, since the combination of references fails to teach the limitations as claimed by Applicant in independent claim 1, and since all of the other rejected claims each depend directly or indirectly from this claim, Applicant respectfully submits that the obviousness rejection should not be maintained.

Conclusion:

For the reasons set forth above, it is respectfully submitted that all claims now stand in condition for allowance.

Should any issues remain after consideration of these Remarks, the Examiner is invited and encouraged to telephone the undersigned in the hope that any such issue may be promptly and satisfactorily resolved.

To any extent required for acceptance of this paper, an extension of time is hereby requested.

In the event that there are additional fees associated with the submission of these papers (including extension of time fees), authorization is hereby provided to withdraw such fees from Deposit Account No. 04-0500.

May 19, 2005

Respectfully submitted,

Brenda D. Wentz

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Registration No. 48,643
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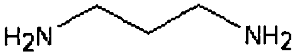
EXHIBIT A

1,3-Propanediamine

- **Formula:** $C_3H_{10}N_2$
- **Molecular Weight:** 74.12
- **CAS Registry Number:** 109-76-2
- **Chemical Structure:**



  This structure is also available as a 2d Mol file.
- **Other Names:** Propane-1,3-diamine; Trimethylenediamine; 1,3-Diaminopropane; 1,3-Propylenediamine; H2N(CH2)3NH2
- Notes / Error Report
- **Other Data Available:**
  - Phase change data
  - Reaction thermochemistry data
  - Gas phase ion energetics data
  - Ion clustering data
  - Mass Spectrum
  - Gas phase kinetics (on kinetics web site)
- Switch to calorie-based units

Notes / Error Report

Go To: Top

- Data from NIST Standard Reference Database 69 - March 2003 Release: *NIST Chemistry WebBook*
- The National Institute of Standards and Technology (NIST) uses its best efforts to deliver a high quality copy of the Database and to verify that the data contained therein have been selected on the basis of sound scientific judgment. However, NIST makes no warranties to that effect, and NIST shall not be liable for any damage that may result from errors or omissions in the Database.
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EXHIBIT B

AKZO NOBEL

Product Information **Surface Chemistry**

DUOMEEN® CD

Cocopropylenediamine, distilled
CAS no 61791-63-7

Primary alkyl amine of the general formula

$R\text{-}NH\text{-}(CH_2)_3\text{-}NH_2$

where R represents an alkyl straight chain mainly C12 + C14.

CAS Name: Amines, N-coco alkyltrimethylenediamine

EINECS: 263-195-3

Specification

	Limits	**Method**
Amine number, total	388-450 mgKOH/g	VV/4.001*
Colour	max 3 Gardner	SC/2.001*
Diamine, Mw=257	min. 89%	VV/4.001*
Water content	max. 0.5%	VE/4.003*

*Methods of analysis can be received upon request.

Typical data

Chemical and physical data	**Typical values**
Appearance, 20°C	yellow liquid / paste
Density, 20°C	840 kg/m³
Density, 60°C	820 kg/m³
Equivalent Mass	131g/eq
Flash point	>150°C
Iodine value	6 g I /100g
Melting range	24-30°C
Odour	ammonia like
Viscosity, 60°C	4 mPa s

Solubility

Soluble to a varying extent in alcohols (ethanol, 2-propanol), chloroform and other hydrocarbons.

Typical data are based on our own measurements or derived from the literature. They do not constitute part of the delivery specifications.

Alkyl Chain Distribution	**Typical values**
Alkyl chain distr C_8	5%
Alkyl chain distr C_{10}	6%
Alkyl chain distr C_{12}	50%
Alkyl chain distr C_{14}	19%
Alkyl chain distr C_{16}	10%
Alkyl chain distr C_{18}	10%

The specifications and properties listed above are intended for products manufactured in Europe.

Applications/Functions

* Disinfection
* Sanitizing

* Bactericide / bacteristat
* Fungicide / fungistat
* Algicide / algistat

Packing

- Bulk,
- Drums, steel tight head, net weight: 160 kg

Storage and Handling

The product is stable for at least 2 years, if stored at room temperature in sealed and undamaged containers.

The product is not corrosive to ferrous metals. Containers made from stainless steel or high-density polyethylene can be used. Glass lined vessels are also suitable. Zinc, copper, aluminum or their alloys should not be used. Contact with low-density PE, PVC and most rubbers is to be avoided as this may cause swelling or cracking of these materials.

To maintain colour, the product should be stored below, or in the case of bulk storage, only slightly above the melting point. Higher temperatures can be tolerated where colour maintenance is not of concern. However, the maximum recommended heating coil surface temperature is 100 °C. Prolonged heated storage in air can cause discolouration and degradation. Heated storage vessels should be sealed (with a vent pipe) and preferably be nitrogen blanketed.

If the product is handled and stored at temperatures near or below its melting point there is a risk of separation. In such cases the entire amount should be heated until it melts and homogenizes.

Even at ambient temperatures, amines can absorb carbon dioxide and water from the atmosphere. Absorbed carbon dioxide and moisture can be removed by heating the product above 100 °C.

For cleaning up spoilages collect as much as possible in a clean container for reuse or disposal, absorb the remainder in vermiculite. Metal surfaces can be cleaned with high pressure hot water. For more persistent deposits, high pressure steam or washing with hot 3% acetic acid may be necessary.

Health and Safety

The product should be handled with care. In order to avoid injuries, protective clothing, gloves and safety goggles should be used. Avoid contact with skin and inhalation of vapors. For further information on health and safety see our Safety Data Sheet.

Further Information

For further information, technical service and samples, please contact our nearest Akzo Nobel Sales office or agent/distributor.

DUOMEEN® is a registered trademark in many countries. Issued: 2002-05-25

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Akzo Nobel Surface Chemistry AB, S-444 85 Stenungsund, Sweden
http://www.surfactantseurope.akzonobel.com

AKZO NOBEL

SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY UNDERTAKING

Trade name **DUOMEEN CD**

Chemical description/Application Corrosion inhibitor.

Supplier

Akzo Nobel Surface Chemistry AB
SE 444 85 Stenungsund
SWEDEN
Tel: +46 303 850 00
Fax: +46 303 813 06

Emergency telephone

+ 31 570679211 (Fax. +31 570679801)
Akzo Nobel Chemicals, Deventer, NL

2. COMPOSITION/INFORMATION ON INGREDIENTS

This product is to be considered as a substance according to EU-legislation.

Substance name	EU number	CAS number	Concentration	Symbols	Risk phrases
N-Coco-1,3-diaminopropane	263-195-3	61791-63-7	>89 %	C ,N	R-22, 35, 50

Other information The substance is registered in EINECS.

3. HAZARDS IDENTIFICATION

Corrosive. Causes severe burns. Harmful if swallowed. Burns may occur several hours after the removal of the product. Dangerous for the environment. Very toxic to aquatic organisms.

4. FIRST AID MEASURES

General	Obtain medical attention immediately (show this Safety Data Sheet). Burns may occur several hours after the removal of the product. Skin irritation, if untreated may be prolonged and serious (eg necrosis). This may be prevented by early treatment with medium strength corticosteriods.
Inhalation	Not likely to occur. In case of exposure: Rinse nose and mouth with water. Obtain medical attention.
Skin	Remove immediately contaminated clothing and shoes. Wash skin immediately with 0,5 % acetic acid in water, and then with soap and water. Obtain medical attention.
Eyes	In case of contact with eyes, rinse immediately with 0.5% acetic acid in water for a few minutes, followed by rinsing with plenty of water for as long as possible. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention immediately. Continue to rinse during transport.
Ingestion	Only when conscious, rinse mouth, give plenty of water to drink (approx. 500 ml). Do not induce vomiting! Obtain medical attention immediately.

5. FIRE FIGHTING MEASURES

Extinguishing media	Water spray, fog or mist, foam, powder, carbon dioxide.
Unsuitable extinguishing media	Waterjet.
Special fire fighting procedures	Treat as an oil fire. Water spray may be ineffective unless used by experienced fire fighters. Wear self contained breathing apparatus.
Unusual fire hazards	Non-flammable. If involved in a fire it will support combustion and may decompose to give off toxic materials. Do not breathe fumes.
Hazardous combustion products	No typical hazardous decomposition products known.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	For personal protection see Section 8.
Environmental precautions	Should not be allowed to enter drains or water courses. Dispose of this material and its container at hazardous or special waste collection point.
Methods for cleaning up	Contain spill with inert material. Place in container for disposal according to local regulations. Cover the remainder with inert absorbent (e.g. vermiculite) for disposal. In case of large spillages contact the local authority.

7. HANDLING AND STORAGE

Handling	The usual precautions for handling chemicals should be observed. When using do not eat, drink or smoke. Avoid spilling, skin and eye contact.
Storage	To maintain quality: Avoid elevated temperatures. Reacts with copper, aluminium, zinc and their alloys. For further information see product information sheet.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits	
Comments	No exposure limits have been established.
Engineering controls	Provide eyewash station and safety shower. Keep solutions of 0.5% acetic acid in water at hand.
Personal protection	
Respiratory	Keep respiratory equipment available. If use conditions can generate aerosol or mist, wear suitable respiratory equipment. Wear full face mask supplied with: Gas cartridge K (ammonia, green). Combination filter ABEKP.
Hand	Use protective gloves made of: Nitrile or butyl rubber.
Eyes	Wear tightly fitting safety goggles and full face visor or shield.
Skin and body	Use suitable protective clothing as protection against splashing or contamination. Dry-clean contaminated clothes before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Liquid/paste.		
Colour	Yellow.		
Odour	Slightly ammonia like		
Boiling point/range (°C)	> 300	**Pressure (kPa)**	

Melting point/range (°C)	24-30		
Flash point (°C)	> 100	**Method**	Pensky-Martens ISO 2719
Autoignition temperature (°C)	> 135		
Lower explosion limit (vol %)	-		
Upper explosion limit (vol %)	-		
Vapour pressure	< 10 Pa	**Temperature (°C)**	20
Relative vapour density (air=1)	-		
Density (kg/m3)	840	**Temperature (°C)**	25
Bulk density (kg/m3)	-		
Viscosity	5 mPas	**Temperature (°C)**	60
pH value	-		
pH value diluted solution	-	**Conc. (%)**	
Solubility in water	Insoluble.		
Solubility in other solvents	Soluble in alcohols.		
Partition coefficient (log Pow)	-		

(These data are typical for the product and not a specification)

10. STABILITY AND REACTIVITY

Stability	Avoid elevated temperatures. Stable under recommended storage and handling conditions (see section 7).
Hazardous decomposition products	No typical hazardous decomposition products known.

11. TOXICOLOGICAL INFORMATION

Toxicological data

Health effects

Respiratory	Emits vapours during heating. Inhalation of small volume of vapour may cause irritation of nose, throat and airway.
Skin	Causes severe burns. Burns may occur several hours after the removal of the product. May be absorbed through the skin.
Eyes	Causes burns. Risk of serious damage to eye. Vapour in the eyes may cause irritation and pain.
Ingestion	May cause burns in mucous membranes in throat, oesophagus and stomach.

Component	**N-Coco-1,3-diaminopropane**
Toxicological data	
	LD50. oral rat 200-2000 mg/kg
Genotoxicity	Ames' test: Not mutagenic. Micronucleus test. Negative.

12. ECOLOGICAL INFORMATION

Ecotoxicological data

Partition coefficient (log Pow)	-

Component N-Coco-1,3-diaminopropane

Ecotoxicological data

LC50 96 hours fish < 1 mg/l [1])

EC50 48 hours Daphnia < 1 mg/l [1])

IC50 72 hours algae < 1 mg/l [1])

Ecotoxicology	Very toxic to aquatic organisms.
Degradation	Readily biodegradable. >60% BOD, 28 days, Closed Bottle Test (OECD 301D).
Partition coefficient (log Pow)	-
Other information	[1]) The data are estimated from tests on similar products.

13. DISPOSAL CONSIDERATIONS

Disposal methods Incineration is recommended. Dispose of in accordance with local authority requirements. Nitrous gases may be formed by incineration.

14. TRANSPORT INFORMATION

Proper shipping name Amines, solid, corrosive, n.o.s. (N-Coco-1,3-diaminopropane)

Land transport

UN number	3259	**RID-class**	8
ADR class	8	**RID packing group**	II
ADR packing group	II		
Classification code	C8		
CEFIC number	80GC8-II+III	**Tremcard internal code**	3260

Sea transport

UN number	3259		
IMDG class	8	**EmS**	F-A, S-B
IMDG packing group	II	**Marine pollutant**	No.

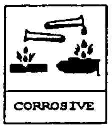
Air transport

UN number	3259	**Subsidary risk**	-
IATA/ICAO class	8	**Packing group**	II

15. REGULATORY INFORMATION

Substance name N-Coco-1,3-diaminopropane

Symbols



Risk phrases	R-22 Harmful if swallowed. R-35 Causes severe burns. R-50 Very toxic to aquatic organisms.
Safety phrases	S-26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S-28 After contact with skin, wash immediately with plenty of 0.5% acetic acid in water, followed by washing with soap and water. S-36/37/39 Wear suitable protective clothing, gloves and eye/face protection. S-45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S-61 Avoid release to the environment. Refer to special instructions/ Safety Data Sheets.
EU number	263-195-3
EU directive	Safety Data Sheet according to EC-directive 2001/58/EC
Water hazard classification	WGK: 3 (Germany).
Other information	In case of contact with eyes, wash immediately with a 0.5% acetic acid in water for a few minutes, followed by rinsing with plenty of water for as long as possible. Eyelids should be held away from the eyeball to ensure thorough rinsing. Always seek medical attention.

16. OTHER INFORMATION

This information only concerns the above mentioned product as supplied and may not be valid if used with other product(s) or in any process. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product.

Composed by	Ann-Christin Borg Thomas Dahl
Explanations to R-phrases in section 2	R-22 Harmful if swallowed. R-35 Causes severe burns.R-50 Very toxic to aquatic organisms.
Date of printing	2003-09-01

EXHIBIT C

AKZO NOBEL

Product Information

Surface Chemistry

DUOMEEN® T

Tallowpropylenediamine
CAS no 61791-55-7

Duomeen T is an alkyl diamine of the general formula R-NH-$(CH_2)_3$-NH_2, where R represents an alkyl straight chain mainly C_{16}-C_{18}

Specification

	Limits	Method
Amine number, total	323-356 mg KOH/g	VV/4.001*
Colour	max 5 Gardner	SC/2.001*
Diamine, M= 319	min 92%	VV/4.001*
Iodine value	32-50 gI/100 g	VV/1.002*
Water	max 1%	VE/4.003*

*Methods of analysis can be received upon request.

Typical data

Chemical and physical data	Typical values
Appearance, 20°C	pale yellow paste
Density, 20°C	840 kg/m³
Density, 60°C	820 kg/m³
Equivalent Mass	169 g/eq
Flash point	>150°C
Melting range	30-40°C
Viscosity, 60°C	6 mPa s

Solubility

Soluble to a varying extent in alcohols (ethanol, IPA), chloroform and other hydrocarbons. Virtually insoluble in water.

Alkyl Chain Distribution	Typical values
C_{12}	1%
C_{14}	4%
C_{16}	31%
C_{18}	64%

The specifications and properties listed above are intended for products manufactured in Europe.

Handling and storage

The product is not corrosive to ferrous metals. Containers made from these or high-density PE may be used. Glass lined vessels are also suitable. Zinc, copper, aluminium or their alloys should not be used. Contact with low-density PE, PVC and most rubbers are to be avoided as this may cause swelling or cracking of these materials.

To maintain colour, the product should be stored below, or, in case of bulk storage, only slightly above the melting point/cloud point. Higher temperatures can be tolerated where colour maintainance is not of concern. However, the maximum recommended heated coil surface temperature is 100°C. Prolonged heated storaged in air can cause discolouration and degredation. Heated storage vessels should be sealed (with a vent pipe) and preferably be nitrogen blanketed.

If the product is handled and stored at temperatures near or below its melting point/cloud point there is a risk of separation. In such cases the entire amount should be heated until it melts and homogenizes.

Acetate salts of the product are converted into substituted amides with low water solubility on heating at temperatures above 55°C. In applications involving heat, the temperature and time of exposure should be kept at a minimum.

Even at ambient temperatures, amines can absorb carbon dioxide and water from the atmosphere. Absorbed carbon dioxide and moisture can be removed by heating the product above 100°C.
Product can be removed from hard surfaces with high pressure hot water. For more persistent deposits, high pressure steam or washing with hot 3% acetic acid may be necessary.
The product should be handled with care. In order to avoid injuries, protective clothing, gloves and safety goggles should be used. Avoid contact with skin and inhalation of vapours.
For further information on health and safety see our Safety Data Sheet.

Further Information

For further information, technical service and samples, please contact our nearest Akzo Nobel Sales office or agent/distributor.

DUOMEEN® is a registered trademark in many countries.

Issued: 2001-03-01

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Akzo Nobel Surface Chemistry AB, S-444 85 Stenungsund, Sweden
http://www.surfactantseurope.akzonobel.com

SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY UNDERTAKING

Trade name	**DUOMEEN T**
Chemical description/Application	Chemical intermediate
Supplier	Akzo Nobel Surface Chemistry AB SE 444 85 Stenungsund SWEDEN Tel: +46 303 850 00 Fax: +46 303 813 06
Emergency telephone	+ 31 570679211 (Fax. +31 570679801) Akzo Nobel Chemicals, Deventer, NL

2. COMPOSITION/INFORMATION ON INGREDIENTS

This product is to be considered as a substance according to EU-legislation.

Substance name	EU number	CAS number	Concentration	Symbols	Risk phrases
N-Tallow-1,3-diaminopropane	263-189-0	61791-55-7	>92 %	C ,N	R-22, 34, 50

Other information The substance is registered in EINECS.

3. HAZARDS IDENTIFICATION

Harmful if swallowed. Causes burns. Dangerous for the environment. Very toxic to aquatic organisms.

4. FIRST AID MEASURES

General	Obtain medical attention immediately (show this Safety Data Sheet). Burns may occur several hours after the removal of the product. Skin irritation, if untreated may be prolonged and serious (eg necrosis). This may be prevented by early treatment with medium strength corticosteriods.
Inhalation	Not likely to occur. In case of exposure: Rinse nose and mouth with water. Obtain medical attention.
Skin	Remove immediately contaminated clothing and shoes. Carefully remove paste or solidified product. Wash skin immediately with 0,5 % acetic acid in water, and then with soap and water. Obtain medical attention.
Eyes	In case of contact with eyes, rinse immediately with 0.5% acetic acid in water for a few minutes, followed by rinsing with plenty of water for as long as possible. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention immediately. Continue to rinse during transport.
Ingestion	Only when conscious, rinse mouth, give plenty of water to drink (approx. 500 ml). Do not induce vomiting! Obtain medical attention immediately.

5. FIRE FIGHTING MEASURES

Extinguishing media	Water spray, fog or mist, foam, powder, carbon dioxide.
Unsuitable extinguishing media	Waterjet.
Special fire fighting procedures	Treat as an oil fire. Water spray may be ineffective unless used by experienced fire fighters. Wear self contained breathing apparatus.
Unusual fire hazards	Non-flammable. If involved in a fire it will support combustion and may decompose to give off toxic materials. Do not breathe fumes.
Hazardous combustion products	No typical hazardous decomposition products known.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	For personal protection see Section 8.
Environmental precautions	Should not be allowed to enter drains or water courses. Dispose of this material and its container at hazardous or special waste collection point.
Methods for cleaning up	Contain spill with inert material. Place in container for disposal according to local regulations. Cover the remainder with inert absorbent (e.g. vermiculite) for disposal. In case of large spillages contact the local authority.

7. HANDLING AND STORAGE

Handling	The usual precautions for handling chemicals should be observed. When using do not eat, drink or smoke. Avoid spilling, skin and eye contact.
Storage	To maintain quality: Avoid elevated temperatures. Reacts with copper, aluminium, zinc and their alloys. For further information see product information sheet.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits	
Comments	No exposure limits have been established.
Engineering controls	Provide eyewash station and safety shower. Keep solutions of 0.5% acetic acid in water at hand.
Personal protection	
Respiratory	Keep respiratory equipment available. If use conditions can generate aerosol or mist, wear suitable respiratory equipment. Wear full face mask supplied with: Gas cartridge K (ammonia, green). Combination filter ABEKP.
Hand	Use protective gloves made of: Nitrile or butyl rubber.
Eyes	Wear tightly fitting safety goggles and full face visor or shield.
Skin and body	Use suitable protective clothing as protection against splashing or contamination. Dry-clean contaminated clothes before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Paste.		
Colour	Off white.		
Odour	Slightly ammonia like		
Boiling point/range (°C)	> 250	**Pressure (kPa)**	

Melting point/range (°C)	30-40		
Flash point (°C)	> 150	**Method**	Pensky-Martens ISO 2719
Autoignition temperature (°C)	> 200		
Lower explosion limit (vol %)	-		
Upper explosion limit (vol %)	-		
Vapour pressure	< 10 Pa	**Temperature (°C)**	20
Relative vapour density (air=1)	-		
Density (kg/m3)	840	**Temperature (°C)**	20
Bulk density (kg/m3)	-		
Viscosity	~ 7 mPas	**Temperature (°C)**	60
pH value	-		
pH value diluted solution	-	**Conc. (%)**	
Solubility in water	Insoluble.		
Solubility in other solvents	Soluble in hydrocarbons.		
Partition coefficient (log Pow)	-		

(These data are typical for the product and not a specification)

10. STABILITY AND REACTIVITY

Stability	Avoid elevated temperatures. Stable under recommended storage and handling conditions (see section 7).
Hazardous decomposition products	No typical hazardous decomposition products known.

11. TOXICOLOGICAL INFORMATION

Toxicological data

	LD50. oral Rat. 945 mg/kg
Irritation	Skin irritation test (rabbit): Corrosive.

Health effects

Respiratory	Emits vapours during heating. Inhalation of small volume of vapour may cause irritation of nose, throat and airway.
Skin	Causes burns. Burns may occur several hours after the removal of the product. May be absorbed through the skin.
Eyes	Causes burns. Risk of serious damage to eye. Vapour in the eyes may cause irritation and pain.
Ingestion	May cause burns in mucous membranes in throat, oesophagus and stomach.

12. ECOLOGICAL INFORMATION

Ecotoxicological data

Partition coefficient (log -

Pow)

Component	**N-Tallow-1,3-diaminopropane**
Ecotoxicological data	
	LC50 96 hours fish < 1 mg/l
	EC50 48 hours Daphnia < 1 mg/l ¹)
	IC50 72 hours algae < 1 mg/l ¹)
Ecotoxicology	Very toxic to aquatic organisms.
Degradation	Readily biodegradable. >60% BOD, 28 days, Closed Bottle Test (OECD 301D).
Partition coefficient (log Pow)	-
Other information	¹) The data are estimated from tests on similar products.

13. DISPOSAL CONSIDERATIONS

Disposal methods	Incineration is recommended. Dispose of in accordance with local authority requirements. Nitrous gases may be formed by incineration.
Waste category	Hazardous waste in accordance with the Council Directive 91/689/EEC of 12 December 1991 on hazardous waste.

14. TRANSPORT INFORMATION

Proper shipping name Amines, solid, corrosive, n.o.s. (Alkylpropylene diamine)

Land transport

UN number	3259	**RID-class**	8
ADR class	8	**RID packing group**	II
ADR packing group	II		
Classification code	C8		
CEFIC number	80GC8-II+III	**Tremcard internal code**	3260

Sea transport

UN number	3259		
IMDG class	8	**EmS**	F-A, S-B
IMDG packing group	II	**Marine pollutant**	No.

Air transport

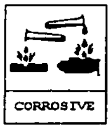
UN number	3259	**Subsidary risk**	-
IATA/ICAO class	8	**Packing group**	II

Other information Bulk tank. Addition to proper shipping name: molten.

15. REGULATORY INFORMATION

Substance name N-Tallow-1,3-diaminopropane

Symbols



Risk phrases	R-22 Harmful if swallowed. R-34 Causes burns. R-50 Very toxic to aquatic organisms.
Safety phrases	S-26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S-28 After contact with skin, wash immediately with plenty of 0.5% acetic acid in water, followed by washing with soap and water. S-36/37/39 Wear suitable protective clothing, gloves and eye/face protection. S-45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S-61 Avoid release to the environment. Refer to special instructions/ Safety Data Sheets.
EU number	263-189-0
EU directive	Safety Data Sheet according to EC-directive 2001/58/EC
Water hazard classification	WGK: 3 (Germany).
Other information	In case of contact with eyes, wash immediately with a 0.5% acetic acid in water for a few minutes, followed by rinsing with plenty of water for as long as possible. Eyelids should be held away from the eyeball to ensure thorough rinsing. Always seek medical attention.

16. OTHER INFORMATION

This information only concerns the above mentioned product as supplied and may not be valid if used with other product(s) or in any process. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product.

Important changes were made in section	14
Composed by	Ann-Christin Borg Thomas Dahl
Explanations to R-phrases in section 2	R-22 Harmful if swallowed. R-34 Causes burns.R-50 Very toxic to aquatic organisms.
Date of printing	2003-09-01

EXHIBIT D

AKZO NOBEL

Product Information **Surface Chemistry**

DUOMEEN® O

Oleylpropylenediamine
CAS no 7173-62-8

Duomeen O is an alkyl diamine of the general formula $R\text{-}NH\text{-}(CH_2)_3\text{-}NH_2$, where R represents an alkyl straight chain mainly C18.

Einecs no 230-528-9

Specification

	Limits	Method
Amine number, total	313 - 349 mg KOH/g	VV/4.001*
Colour	max 8 Gardner	SC/2.001*
Diamine, Mw=322	min 90%	VV/4.001*
Iodine value	min 60 gl/100 g	VV/1.002*
Water content	max 0.5%	VE/4.003*

*Methods of analysis can be received upon request.

Typical data

Chemical and physical data	Typical values
Appearance, 20°C	yellow liquid/paste
Density, 20°C	840 kg/m³
Density, 60°C	820 kg/m³
Equivalent Mass	170 g/eq
Flash point	>150°C
Melting range	10 - 20°C
Viscosity, 60°C	6 mPa s

Solubility

Soluble to a varying extent in alcohols (ethanol, IPA), chloroform and other hydrocarbons. Virtually insoluble in water.

Typical data are based on our own measurements or derived from the literature. They do not constitute part of the delivery specifications.

Alkyl Chain Distribution	Typical values
Alkyl chain distr C_{12}	1%
Alkyl chain distr C_{14}	4%

Alkyl chain distr C_{16}	12%
Alkyl chain distr C_{18}	83%

The specifications and properties listed above are intended for products manufactured in Europe.

Handling and safety

The product is stable for at least 3 years, if stored at room temperature in sealed and undamaged containers.

The product is not corrosive to ferrous metals. Containers made from these or high-density PE may be used. Glass lined vessels are also suitable. Zinc, copper, aluminium or their alloys should not be used. Contact with low-density PE, PVC and most rubbers are to be avoided as this may cause swelling or cracking of these materials.

To maintain colour, the product should be stored below, or, in the case of bulk storage, only slightly above the melting point/cloud point. Higher temperatures can be tolerated where colour maintenance is not of concern. However, the maximum recommended heating coil surface temperature is 100°C. Prolonged heated storage in air can cause discoloura-tion and degredation. Heated storage vessels should be sealed (with a vent pipe) and preferably be nitro-gen blanketed.

If the product is handled and stored at temperatures near or below its melting point/cloud point there is a risk of separa-tion. In such cases the entire amount should be heated until it melts and homogenizes.

Acetate salts of the product are converted into substituted amides with low water solubility on heating at temperatures above 55°C. In applications involving heat, the temperature and time of exposure should be kept at a minimum.

Even at ambient temperatures, amines can absorb carbon dioxide and water from the atmosphere. Absorbed carbon dioxide and moisture can be removed by heating the product above 100°C.

Product can be removed from hard surfaces with high pressure hot water. For more persistent deposits, high pressure steam or washing with hot 3% acetic acid may be necessary.

The product should be handled with care. In order to avoid injuries, protective clothing, gloves and safety goggles should be used. Avoid contact with skin and inhalation of vapours.

For further information on health and safety see our Safety Data Sheet.

For further information, technical service and samples, please contact our nearest Akzo Nobel Sales office or agent.

Packing

- Bulk, heated containers or road tankcars.
- Drum, steel, non coated tight head, net weight 170 kg.

Further Information

For further information, technical service and samples, please contact our nearest Akzo Nobel Sales office or agent/distributor.

DUOMEEN® is a registered trademark in many countries.

Issued: 2004-12-01

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Akzo Nobel Surface Chemistry AB, S-444 85 Stenungsund, Sweden
http://www.surfactantseurope.akzonobel.com

SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY UNDERTAKING

Trade name	**DUOMEEN O**
Chemical description/Application	Surfactant
Supplier	Akzo Nobel Surface Chemistry AB SE 444 85 Stenungsund SWEDEN Tel: +46 303 850 00 Fax: +46 303 813 06
Emergency telephone	+ 31 570679211 (Fax. +31 570679801) Akzo Nobel Chemicals, Deventer, NL

2. COMPOSITION/INFORMATION ON INGREDIENTS

This product is to be considered as a substance according to EU-legislation.

Substance name	EU number	CAS number	Concentration	Symbols	Risk phrases
N-Oleyl-1,3-diaminopropane	230-528-9	7173-62-8	>90 %	C ,N	R-22, 34, 50

Other information The substance is registered in EINECS.

3. HAZARDS IDENTIFICATION

Causes burns. Harmful if swallowed. Dangerous for the environment. Very toxic to aquatic organisms.

4. FIRST AID MEASURES

General	Obtain medical attention immediately (show this Safety Data Sheet). Burns may occur several hours after the removal of the product. Skin irritation, if untreated may be prolonged and serious (eg necrosis). This may be prevented by early treatment with medium strength corticosteriods.
Inhalation	Not likely to occur. In case of exposure: Rinse nose and mouth with water. Obtain medical attention.
Skin	Remove immediately contaminated clothing and shoes. Carefully remove paste or solidified product. Wash skin immediately with 0,5 % acetic acid in water, and then with soap and water. Obtain medical attention.
Eyes	In case of contact with eyes, rinse immediately with 0.5% acetic acid in water for a few minutes, followed by rinsing with plenty of water for as long as possible. Eyelids should be held away from the eyeball to ensure thorough rinsing. Get medical attention immediately. Continue to rinse during transport.
Ingestion	Only when conscious, rinse mouth, give plenty of water to drink (approx. 500 ml). Do not induce vomiting! Obtain medical attention immediately.

5. FIRE FIGHTING MEASURES

Extinguishing media	Water spray, fog or mist, foam, powder, carbon dioxide.
Unsuitable extinguishing media	Waterjet.
Special fire fighting procedures	Treat as an oil fire. Water spray may be ineffective unless used by experienced fire fighters. Wear self contained breathing apparatus.
Unusual fire hazards	Non-flammable. If involved in a fire it will support combustion and may decompose to give off toxic materials. Do not breathe fumes.
Hazardous combustion products	No typical hazardous decomposition products known.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	For personal protection see Section 8.
Environmental precautions	Should not be allowed to enter drains or water courses. Dispose of this material and its container at hazardous or special waste collection point.
Methods for cleaning up	Contain spill with inert material. Place in container for disposal according to local regulations. Cover the remainder with inert absorbent (e.g. vermiculite) for disposal. In case of large spillages contact the local authority.

7. HANDLING AND STORAGE

Handling	The usual precautions for handling chemicals should be observed. When using do not eat, drink or smoke. Avoid spilling, skin and eye contact.
Storage	To maintain quality: Avoid elevated temperatures. Reacts with copper, aluminium, zinc and their alloys. For further information see product information sheet.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits	
Comments	No exposure limits have been established.
Engineering controls	Provide eyewash station and safety shower. Keep solutions of 0.5% acetic acid in water at hand.
Personal protection	
Respiratory	Keep respiratory equipment available. If use conditions can generate aerosol or mist, wear suitable respiratory equipment. Wear full face mask supplied with: Gas cartridge K (ammonia, green). Combination filter ABEKP.
Hand	Use protective gloves made of: Nitrile or butyl rubber.
Eyes	Wear tightly fitting safety goggles and full face visor or shield.
Skin and body	Use suitable protective clothing as protection against splashing or contamination. Dry-clean contaminated clothes before reuse.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Liquid/paste.		
Colour	Yellow.		
Odour	Slightly ammonia like		
Boiling point/range (°C)	> 250	**Pressure (kPa)**	

Melting point/range (°C)	9-20		
Flash point (°C)	> 100	**Method**	Pensky-Martens ISO 2719
Autoignition temperature (°C)	-		
Lower explosion limit (vol %)	-		
Upper explosion limit (vol %)	-		
Vapour pressure	< 10 Pa	**Temperature (°C)**	20
Relative vapour density (air=1)	-		
Density (kg/m3)	840	**Temperature (°C)**	25
Bulk density (kg/m3)	-		
Viscosity	-	**Temperature (°C)**	
pH value	-		
pH value diluted solution	-	**Conc. (%)**	
Solubility in water	Insoluble.		
Solubility in other solvents	-		

(These data are typical for the product and not a specification)

10. STABILITY AND REACTIVITY

Stability	Avoid elevated temperatures. Stable under recommended storage and handling conditions (see section 7).
Hazardous decomposition products	No typical hazardous decomposition products known.

11. TOXICOLOGICAL INFORMATION

Toxicological data

Health effects

Respiratory	Emits vapours during heating. Inhalation of small volume of vapour may cause irritation of nose, throat and airway.
Skin	Causes burns. Burns may occur several hours after the removal of the product. May be absorbed through the skin.
Eyes	Causes burns. Risk of serious damage to eye. Vapour in the eyes may cause irritation and pain.
Ingestion	May cause burns in mucous membranes in throat, oesophagus and stomach.

Component **N-Oleyl-1,3-diaminopropane**

Toxicological data

LD50. oral rat > 200-2000 mg/kg ¹)

Toxicological information 1) The value is estimated from tests on similar products.

12. ECOLOGICAL INFORMATION

Ecotoxicological data

Degradation	Primary biodegradation > 90%. The product complies with the decree on surfactant biogradebillity of the European Community (73/404/EEG; 73/405/EEG)
Component	**N-Oleyl-1,3-diaminopropane**
Ecotoxicological data	
	LC50 96 hours fish < 1 mg/l 1)
	EC50 48 hours Daphnia < 1 mg/l
	IC50 72 hours algae < 1 mg/l 1)
Ecotoxicology	Very toxic to aquatic organisms.
Degradation	Readily biodegradable. >60% BOD, 28 days, Closed Bottle Test (OECD 301D).
Other information	1) The data are estimated from tests on similar products.

13. DISPOSAL CONSIDERATIONS

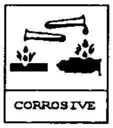
Disposal methods	Incineration is recommended. Dispose of in accordance with local authority requirements. Nitrous gases may be formed by incineration.

14. TRANSPORT INFORMATION

Proper shipping name	Amines, liquid, corrosive, n.o.s. (N-Oleyl-1,3-diaminopropane)		
Land transport			
UN number	2735	**RID-class**	8
ADR class	8	**RID packing group**	II
ADR packing group	II		
Classification code	C7		
CEFIC number	80GC7-II+III	**Tremcard internal code**	541
Sea transport			
UN number	2735		
IMDG class	8	**EmS**	F-A, S-B
IMDG packing group	II	**Marine pollutant**	No.
Air transport			
UN number	2735	**Subsidary risk**	-
IATA/ICAO class	8	**Packing group**	II

15. REGULATORY INFORMATION

Substance name	N-Oleyl-1,3-diaminopropane
Symbols	



Risk phrases	R-22 Harmful if swallowed. R-34 Causes burns. R-50 Very toxic to aquatic organisms.
Safety phrases	S-26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S-28 After contact with skin, wash immediately with plenty of 0.5% acetic acid in water, followed by washing with soap and water. S-36/37/39 Wear suitable protective clothing, gloves and eye/face protection. S-45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S-61 Avoid release to the environment. Refer to special instructions/ Safety Data Sheets.
EU number	230-528-9
EU directive	Safety Data Sheet according to EC-directive 2001/58/EC
Water hazard classification	WGK: 3 (Germany).
Other information	In case of contact with eyes, wash immediately with a 0.5% acetic acid in water for a few minutes, followed by rinsing with plenty of water for as long as possible. Eyelids should be held away from the eyeball to ensure thorough rinsing. Always seek medical attention.

16. OTHER INFORMATION

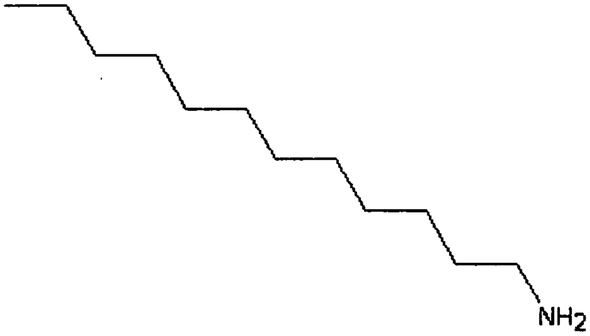
This information only concerns the above mentioned product as supplied and may not be valid if used with other product(s) or in any process. It remains the user's own responsibility to make sure that the information is appropriate and complete for his special use of this product.

Important changes were made in section	15.
Composed by	Barbro Dihné Magnus Franck
Explanations to R-phrases in section 2	R-22 Harmful if swallowed. R-34 Causes burns.R-50 Very toxic to aquatic organisms.
Date of printing	2003-06-26

EXHIBIT E

1-Dodecanamine

- **Formula:** $C_{12}H_{27}N$
- **Molecular Weight:** 185.35
- **CAS Registry Number:** 124-22-1
- **Chemical Structure:**



This structure is also available as a 2d Mol file.

- **Other Names:** Dodecylamine; n-Dodecylamine; Alamine 4; Armeen 12D; Laurinamine; Laurylamine; Nissan Amine BB; 1-Aminododecane; Amine 12; Armeen 12; Lauramine; Lauramine (primary amine); Radiamine 6164
- Notes / Error Report
- **Other Data Available:**
  - Phase change data
  - Reaction thermochemistry data
  - IR Spectrum
  - Mass Spectrum
- Switch to calorie-based units

Notes / Error Report

Go To: Top

- Data from NIST Standard Reference Database 69 - March 2003 Release: *NIST Chemistry WebBook*
- The National Institute of Standards and Technology (NIST) uses its best efforts to deliver a high quality copy of the Database and to verify that the data contained therein have been selected on the basis of sound scientific judgment. However, NIST makes no warranties to that effect, and NIST shall not be liable for any damage that may result from errors or omissions in the Database.
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AKZO NOBEL

Product Information **Surface Chemistry**

ARMEEN® 12D

Dodecylamine, distilled
CAS no 124-22-1

Primary alkyl amine of the general formula R-NH_2, where R represents a straight alkyl chain mainly C_{12}.
CAS Name: 1-Dodecanamine
EINECS: 204-690-6
Synonyms: Laurylamine

Specification

	Limits	**Method**
Alkyl chain distr C_{12}	min 98%	CG/3.002*
Amine number, total	297-304 mgKOH/g	VE/1.005*
Colour Gardner	max 1	SC/2.001*
Primary amine, M=185	min 98%	VE/1.005*
Sec. + tertiary amine, M=353	max 2%	VE/1.005*
Water	max 0.5%	VE/4.003*

*Methods of analysis can be received upon request.

Typical data

Chemical and physical data	**Typical values**
Amine number, total	302 mgKOH/g
Appearance, 20°C	white solid
Colour APHA	5
Colour Gardner	<1
Density, 20°C	800 kg/m^3
Density, 60°C	780 kg/m^3
Flash point	>100°C
Iodine value	1 gI/100 g
Melting range	20-25°C
Odour	mild ammoniacal
Primary amine, M=185	99.4%
Sec. + tertiary amine, M=353	0.1%
Viscosity, 60°C	4 mPa.s
Water	<0.2%

Solubility

Soluble to a varying extent in alcohols (ethanol, IPA), chloroform and other hydrocarbons. Virtually insoluble in water.

Typical data are based on our own measurements or derived from the literature. They do not constitute part of the delivery specifications.

Alkyl Chain Distribution	Typical values
<=C10	0.5%
>=C14	1%
C_{12}	98.5%

The specifications and properties listed above are intended for products manufactured in Europe.

Applications/Functions

* Intermediate
- ethoxylates
- dodecylguanidine acetate

Packing

- Bulk, heated containers or road tankcars.
- Drum, steel, non coated tight head, net weight 155 kg.

Stability, Storage and Handling

Armeen 12D is stable for at least 3 years, if stored at room temperature in sealed and undamaged containers.

Armeen 12D is not corrosive to ferrous metals. Containers made from these or high-density PE may be used. Glass lined vessels are also suitable. Zinc, copper, aluminium or their alloys should not be used. Contact with low-density PE, PVC and most rubbers is to be avoided as this may cause swelling or cracking of these materials.

To maintain colour, **Armeen 12D** should be stored below, or, in the case of bulk storage, only slightly above the melting point/cloud point. Higher temperatures can be tolerated where colour maintenance is not of concern. However, the maximum recommended heating coil surface temperatures is 100°C. Prolonged heated storage in air can cause discolouration and degradation. Heated storage vessels should be sealed (with a vent pipe) and preferably be nitrogen blanketed.

Even at ambient temperatures, amines can absorb carbon dioxide and water from the atmosphere. Absorbed carbon dioxide and moisture can be removed by heating the product above 100°C.

Armeen 12D can be removed from hard surfaces with high pressure hot water. For more persistent deposits, high pressure steam or washing with hot 3% acetic acid may be necessary.

Quality Assurance

The manufacture of this product is controlled by a Quality Management System, which has been assessed and registered as meeting the requirements of ISO9002 / EN29002. More details on request.

Health and Safety

Armeen 12D should be handled with care. In order to avoid injuries, protective clothing, gloves and safety goggles should be used. Avoid contact with skin and inhalation of vapours. For further information on health and safety see our Safety Data Sheet.

Further Information

For further information, technical service and samples, please contact our nearest Akzo Nobel Sales office or agent/distributor.

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Issued: 2002-04-24

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